

**Sea Lice Analysis**  
**2004 Beach Seine Samples**  
**Bedwell Sound, Fortune Channel and Tofino Inlet**

Prepared for

**West Coast Vancouver Island  
Aquatic Management Society**  
3017 Third Ave.  
Port Alberni, BC V9Y 2A4

Prepared by

Lance Stewardson



2221 Canterbury Lane  
Campbell River, BC. V9W 7Y7  
(250) 923-0432  
[mainstreambio@telus.net](mailto:mainstreambio@telus.net)

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## Introduction

In October 2004 Mainstream Biological Consulting was contracted, by the West Coast Vancouver Island Aquatic Management Society, to conduct sea lice infection analysis of salmonid smolts captured during beach seining in Clayoquot Sound, BC. Fish captured at 23 sites in Bedwell Sound, Fortune Channel and Tofino Inlet, between April 1, 2004 and June 8, 2004, were inspected for sea lice infection. The samples consisted of 2086 chum salmon (*Oncorhynchus keta*), 316 chinook salmon (*O. tshawytscha*), and 32 coho salmon (*O. kisutch*) smolts, as well as 11 three-spine stickleback (*Gasterosteus aculeatus*) and one shiner perch (*Cymatogaster aggregata*).

Parasitic copepods from the family Caligidae (sea lice) found in the coastal waters of British Columbia are divided into two genus with a total 13 species (Arthur and Margolis 1979, McDonald and Margolis 1995). Two species of sea lice are commonly found on Pacific salmon; *Lepeophtheirus salmonis* and *Caligus clemensi* (Jones, 2004). Both of these species have similar life histories and developmental stages (Kabata 1972, Johnson and Albright 1991). The lice hatch from eggs and develop through two free-swimming nauplii stages before developing into a free-swimming copepodid. At this point, the lice attach to their hosts and develop through four chalimus stages. The chalimus are “non-motile” and are attached to their host by a frontal filament. The final chalimus stage terminates as the lice become “motile” and the lice are no longer attached to their hosts by the frontal filament. The free moving lice now develop through a pre-adult stage before becoming reproductively viable adults.

For the purpose of this study, sea lice were identified as being in the non-motile or motile stage of their life history. Non-motile lice were identified as chalimus and were not identified to genus. Motile lice (pre-adults and adults) were identified as either *Lepeophtheirus sp.* or *Caligus sp.* and as male or female specimens. The motile lice were not identified to species, but have been assumed to be either *L. salmonis* or *C. clemensi* due to the lack of documented infections of Pacific salmon by other lice species.

## 1.0 Methods

The West Coast Vancouver Island Aquatic Management Society provided Mainstream Biological Consulting with frozen samples collected from 23 sites in Bedwell Sound, Fortune Channel and Tofino Inlet, BC. Samples taken from each site were in large ziplock bags. Each ziplock bag contained a piece of paper, identifying the site name and the date of the sample, and individually bagged fish captured and taken as samples at the site.

Fish samples were thawed immediately prior to analysis. Individual fish were identified to species and counted. The results of this identification and count were compared to the reported data found on the field data sheets provided with the samples.

A standardized data sheet was used to record results from each site. The site name, sample date and number of fish and species present were recorded on the sheet. The date and time of the start of the analysis was also noted on the data sheet. Data from individual fish was recorded on this sheet as the analysis proceeded.

Individual fish, when thawed, were removed from their bag, using a pair of forceps at the caudal peduncle, and placed in a petri dish. Each fish was then scanned under a stereoscopic dissection microscope for the presence of sea lice. The microscope was set at a magnification of 20X for the preliminary survey of each fish sample, but magnification was occasionally increased to 40X during individual lice identification.

Microscopic analysis of each individual fish began at the anterior end of the left hand side of the specimen. The head was examined first, after which a scan was made along the dorsal half of the specimen working towards the posterior end and the tail. The dorsal fin was lifted and expanded, as was the caudal fin, with a pair of forceps. From the posterior end a return scan was made along the ventral half of the specimen back to the head. The anal fin, pelvic fin and pectoral fin were also lifted and expanded using a pair of forceps. The fish was then flipped using a pair of forceps at the caudal peduncle and the procedure was repeated on the right hand side of the specimen. Additional scans were made longitudinally down the fish if the entire depth of the fish could not be seen in a single pass.

Any lice observed on the specimens were recorded as being present in one of six areas. The divisions and descriptor used for each of these areas can be found in Figure 1 below.

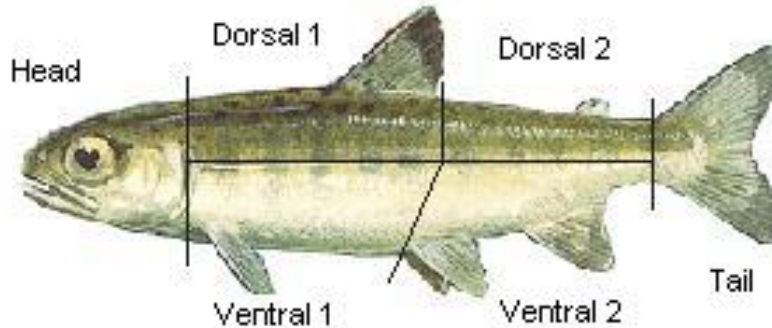


Figure 1: The divisions and descriptors used to identify the location of lice observed on sample specimens (Image adapted from <http://cybersalmon.fws.gov/coho.html>)

Using characteristics outlined by Kabata (1972) and Johnson and Albright (1991) lice observed on individual fish specimens were identified as either non-motile chalimus, or motile pre-adults and adults. Lice identified as being in one of the four chalimus stages of their life history were not identified further and were recorded on the data sheet as chalimus. Motile lice, either pre-adults or adults, were identified as either *Lepeophtheirus salmonis* or *Caligus clemensi*. Individual motile lice were also identified as male or female and were recorded on the data sheet.

Chalimus were identified primarily by the presence of the frontal filament. Size, genital development and leg development were used as secondary identifying characteristics. Motile lice were identified to species by the presence or absence of lunules. If lunules were absent the lice was identified as *L. salmonis*. The lice was identified as *C. clemensi* if lunules were present. If eggs sacks were not present to identify the lice as an adult female, differences in the shape of the genital segment were used to determine if lice from either species were male or female.

Each individual bag was visually inspected after the removal of the specimen for the presence of pre-adult or adult lice that may have become dislodged from the fish specimen. Any sea lice found in the sample bags were identified under the microscope using the same characteristics outlined above. These “loose” lice were recorded on the data sheet with the corresponding specimen’s data and it was assumed that the lice had come from that individual.

Additional comments were added to the data sheet regarding whether or not the lice observed were found on fins of the fish specimen.

Individual fish specimens were measured (fork length for salmonids, total length for non-salmonids) in millimetres and weighed to the nearest tenth of a gram. Lengths and weights were also recorded on the data sheet with the specimen's corresponding lice analysis results.

Individual fish specimens were returned to their respective individual bags and each site's samples were repackaged in the large ziplock bags. All samples were then refrozen.

In order to ensure the accuracy of the sea lice identification, a sub-sample of fish specimens totalling 7.4% of the total sample was sent to a second technician to undergo similar analysis. The results from the two independent analyses were compared and a confidence level for the accuracy of the initial sea lice analysis was determined.

## 2.0 Results

Results regarding the composition of the sample, the sea lice infection and the confidence level of the identified lice are presented in the following sections.

### 2.1 Sample composition

The samples reported on the field data sheets provided were compared to the actual samples identified during sea lice analysis. Only salmonid species were considered during this comparison. The tabulated results from the comparison can be found in Appendix I.

The field data sheets provided with the beach seine samples indicated a total of 159 separate beach seines were completed. Of the 159 beach seine sets, 118 were successful in capturing salmonids while no salmonids were captured in 41 sets.

Of the 159 different beach seines that field data sheets reported no captured fish or fish retained for analysis, 64 (40.3%) had counting or species identification errors. Of the remaining 95 error free sites, 41 (25.8%) reported no captured fish or no samples taken. The remaining 54 (34.0%) reported accurate sample size and species composition.

A counting error occurred when the number of fish reported on the field data sheet for a given species did not match the number of individual fish provided for sea lice analysis. Errors of this type occurred 19 times (11.9%). These errors most often resulted in one too many or one too few samples being reported (n=9); however, counting errors on three occasions involved three fish.

A species identification error occurred when the total number of fish reported on the field data sheet matched the total number of samples present, but the reported number of individuals for a given species did not match the number provided for sea lice analysis. Errors of this type occurred 37 times (23.3%). These errors most often resulted when chinook were incorrectly identified as chum smolts (n=26).

A combination of both errors occurred eight times (5.0%).



Table 1 below outlines the total reported captures and samples and the actual number of samples for each species from all sites.

Table 1: The total reported captures and samples taken from field data sheets compared to the actual number of samples inspected for sea lice.

<b>Species</b>	<b>Total Captures</b>	<b>Reported Samples</b>	<b>Actual Samples</b>
chum	25261	1874	2086
chinook	216	211	316
coho	765	154	32

In addition to the 118 samples with corresponding data sheets, two other bags of retained fish samples were provided that did not correspond to any of the field data sheets provided. One bag containing 29 chum and a single chinook was labelled as coming from the site called Fortune Channel #8 on April 28, 2004, but a corresponding field data sheet was not found for the seine site on that date. Another bag containing 30 chum, one chinook and one coho was not labelled and could not be correlated to any field data sheets. Neither of these samples were included in the above analysis of errors, but have been included in lice infection rate calculations.

## 2.2 Lice infection

A total of 2446 individual fish specimens were inspected for sea lice infection. A total of 2086 chum salmon, 316 chinook salmon and 32 coho salmon smolts were inspected. The remaining 12 fish consisted of 11 three-spine stickleback and one shiner perch.

All fish were inspected for sea lice and the individual fish results are presented in Appendix II. Further analysis of the results regarding infection rate, lice location and life history stage was conducted and reported for salmonid species only. These results are found in the Tables 2, 3 and 4 below. Average weights and lengths for the inspected salmonid species are presented in Table 5.

No statistical analysis of the results took place. All reported results are based on the entire sample, and changes over time or spatial differences have not been investigated.

Of the 2086 chum salmon inspected for sea lice, 204 individuals were found infected with lice. A total of 162 of these individuals were infected with a single louse, while 34

individuals were infected with two lice. A total of seven juvenile chum salmon were found infected with three lice and one was found infected with four lice.

A total of 255 individual lice were found on the entire chum salmon sample population. Of these, 245 lice (96.1%) were found to be in the chalimus stage of their life cycle. The remaining ten lice were identified as adults or pre-adults. Eight of the adult lice were identified as *L. salmonis* (five males and three females). The remaining two adult or pre-adult lice were identified as *C. clemensi* (one male and one female)

Of the 316 chinook salmon inspected for sea lice, 16 individuals were found infected with lice. Of these, nine individuals were infected with a single louse, while another four individuals were infected with two lice. Two chinook salmon smolts were found infected with three lice and one individual was infected with six lice.

Table 2: Sea lice infection rates of salmonids captured in Bedwell Sound, Fortune Channel and Tofino Inlet, BC between April 1 and June 8 2004.

Species	Sample Size (n)	Total # lice observed	Total # fish infected	Infection Rate (% fish)
chum	2086	255	204	9.8
chinook	316	29	16	5.1
coho	32	10	5	15.6

A total of 29 individual lice were found on the entire chinook salmon sample population. Of these, 25 lice (86.2%) were found to be in the chalimus stage of their life cycle. Three of the remaining four lice were found to be *L. salmonis* (two males and one female), while the remaining louse was found to be a female *C. clemensi*.

Table 3: Number of individual sea lice observed on salmonids in Bedwell Sound, Fortune Channel and Tofino Inlet, BC between April 1 and June 8, 2004.

Species	Total # lice observed	Number of Chalimus	Number of <i>Caligus clemensi</i> .	Number of <i>Lepeophtheirus salmonis</i>
chum	255	245	1M/1F	5M/3F
chinook	29	25	1F	2M/1F
coho	10	7	--	1M/2F

Table Codes: M – Male, F – Female

Of the 32 coho salmon inspected for sea lice, five individuals were found infected with lice. One coho was infected with two chalimus stage lice, while two other coho were infected with a single chalimus stage louse. The fourth infected coho salmon was found

infected with two adult female *L. salmonis* and the final coho was infected with three chalimus stage lice and an adult male *L. salmonis*.

Table 4: Distribution of sea lice present on individual salmonids captured in Bedwell Sound, Fortune Channel and Tofino Inlet, BC between April 1 and June 8, 2004.

Species	Total lice (n)	% lice / body segment <sup>1</sup>						Tail	Fins <sup>2</sup>
		Head	Dorsal 1	Dorsal 2	Ventral 1	Ventral 2			
chum	255	17.6	15.7	3.5	15.3	42.0	3.9	56.1	
chinook	29	3.4	10.3	3.4	6.9	62.1	6.9	75.9	
coho	10	10.0	30.0	10.0	30.0	10.0	0.0	50.0	

1 – Percentages for body segments do not include detached lice found in sample bags.

2 – Fin percentage includes lice found on fins associated with all body segments. Therefore, lice reported in each body segment may also appear as part of the fin percentage.

Table 5: Average lengths and weights of chum, chinook and coho salmon smolts captured in Bedwell Sound, Fortune channel and Tofino Inlet, BC between April 1 and June 8, 2004

Species	Weight (g)			Length (mm)		
	Average	Median	Std. Dev.	Average	Median	Std. Dev.
chum	0.8	0.6	0.6	43.3	41.0	7.3
chinook	1.1	0.7	1.1	45.5	42.0	9.0
coho	7.5	7.3	2.4	84.3	83.0	9.5

Anecdotal comments regarding the presence of a parasitic isopod *Lironeca sp.* were also made during the inspection of all salmonid species. As this parasite was not the focus of the project its presence with individual fish samples was not tracked, but a running total of the number of infected individuals was kept throughout the analysis. *Lironeca sp.* was observed on 64 of 2434 (2.6%) salmonid samples. Individual fish were commonly infected with more than one individual *Lironeca sp.* with three observed on a single smolt on several occasions.

### 2.3 Confidence level

The comparison of individual infected fish analysed by Mainstream Biological Consulting staff and subsequently by Tom McDonald of Worms 'n Us Parasite Identification Service in Nanaimo can be found in Appendix III. Mr. McDonald is a parasitologist with 30 years experience with the Department of Fisheries and Oceans.

A subsample of 181 salmonids (143 chum, and 38 chinook), totalling 7.4% of the inspected samples, were selected to serve as quality control and ensure the accuracy of the results discussed above.

A consensus was reached with 175 of the 181 samples (96.7%) used in the quality control. Mainstream Biological Consulting staff identified five additional chalimus stage lice on five of the samples that did not match. Tom McDonald located one chalimus stage louse that was not identified during the original analysis. Fish with sea lice not reported by Mainstream Biological Consulting staff accounted for 0.6% of the subsample that was submitted for a second inspection.

It is possible that the five additional chalimus found during the original inspection may have become dislodged during the repackaging and refreezing after the initial analysis or during the re-thawing and handling for the subsequent second inspection.

### 3.0 References

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## Appendix I – Sample Composition Data

Site Name	Site #	Date (dd/mm/yy)	Total Capture			Reported Samples			Actual Samples		
			chinook	coho	chum	chinook	coho	chum	chinook	coho	chum
Baxter	11	01/04/2004	0	0	9	0	0	9	3	0	10
Fortune Channel	6	01/04/2004	0	300	0	0	30	0	0	0	28
Fortune Channel	7	01/04/2004	0	8	0	0	8	0	0	0	9
Fortune Channel	8	01/04/2004	0	0	0	0	0	0	0	0	0
Fortune Channel	9	01/04/2004	0	0	9	0	0	9	0	0	9
Fortune Channel	10	01/04/2004	0	150	0	0	30	0	0	0	27
Indian Bay	5	01/04/2004	0	9	0	0	9	0	2	0	7
Tofino Inlet	1	01/04/2004	0	0	0	0	0	0	0	0	0
Tofino Inlet	2	01/04/2004	0	0	19	0	0	19	18	0	1
Tofino Inlet	3	01/04/2004	0	0	1	0	0	1	0	0	1
Tofino Inlet	4	01/04/2004	0	0	200	0	0	30	5	0	26
Bare Bluff	1	07/04/2004	0	0	544	0	0	30	0	1	29
E Bedwell	3	07/04/2004	0	0	400	0	0	30	0	0	30
N Cypress	8	07/04/2004	0	0	3	0	0	3	0	0	3
NE Matlset Narrows	12	07/04/2004	0	0	63	0	0	30	0	0	30
NW Bedwell	4	07/04/2004	0	0	34	0	0	30	0	0	30
S Cypress	9	07/04/2004	0	0	0	0	0	0	0	0	0
S Kraan	13	07/04/2004	0	0	0	0	0	0	0	0	0
S Matlset Narrows	7	07/04/2004	0	0	34	0	0	30	0	0	30
SW Bedwell	5	07/04/2004	0	0	12	0	0	6	0	0	6
W Bedwell	2	07/04/2004	0	0	160	0	0	30	0	0	30
Baxter	11	12/04/2004	0	0	150	0	0	30	0	0	30
Fortune Channel	6	12/04/2004	0	0	150	0	0	30	0	0	30
Fortune Channel	7	12/04/2004	0	0	6	0	0	6	0	0	6
Fortune Channel	8	12/04/2004	0	0	300	0	0	30	1	0	29
Fortune Channel	9	12/04/2004	0	0	215	0	0	15	2	0	12
Indian Bay	5	12/04/2004	0	0	1	0	0	1	0	0	1
Tofino Inlet	1	12/04/2004	0	0	60	0	0	30	6	0	24

Site Name	Site #	Date (dd/mm/yy)	Total Capture			Reported Samples			Actual Samples		
			chinook	coho	chum	chinook	coho	chum	chinook	coho	chum
Tofino Inlet	2	12/04/2004	6	0	3	6	0	3	6	0	3
Tofino Inlet	3	12/04/2004	0	0	0	0	0	0	0	0	0
Tofino Inlet	4	12/04/2004	0	0	500	0	0	30	0	0	31
Bare Bluff	1	14/04/2004	0	0	3500	0	0	30	0	0	30
N Cypress	8	14/04/2004	0	0	0	0	0	0	0	0	0
NE Matiset Narrows	12	14/04/2004	0	0	300	0	0	30	0	0	30
NW Bedwell	4	14/04/2004	0	0	400	0	0	30	0	0	30
S Cypress	9	14/04/2004	0	0	0	0	0	0	0	0	0
S Kraan	13	14/04/2004	0	0	0	0	0	0	0	0	0
S Matiset Narrows	7	14/04/2004	0	0	0	0	0	0	0	0	0
SW Bedwell	5	14/04/2004	0	0	400	0	0	30	0	0	30
W Bedwell	2	14/04/2004	0	0	60	0	0	30	0	0	30
Baxter	11	20/04/2004	0	0	150	0	0	30	4	0	26
Fortune Channel	6	20/04/2004	0	0	700	0	0	30	0	0	33
Fortune Channel	7	20/04/2004	0	0	0	0	0	0	0	0	0
Fortune Channel	8	20/04/2004	1	0	1	0	0	1	0	0	0
Fortune Channel	9	20/04/2004	0	0	0	0	0	0	1	0	0
Indian Bay	5	20/04/2004	0	0	1	0	0	1	1	0	0
Tofino Inlet	1	20/04/2004	0	0	2	0	0	2	0	0	2
Tofino Inlet	2	20/04/2004	0	0	35	0	0	30	29	0	2
Tofino Inlet	3	20/04/2004	0	0	19	0	0	19	3	0	16
Tofino Inlet	4	20/04/2004	0	0	250	0	0	30	0	0	30
Tofino Inlet	7	20/04/2004	0	0	0	0	0	0	0	0	0
Bare Bluff	1	22/04/2004	0	0	250	0	0	30	0	0	30
E Bedwell	3	22/04/2004	1	0	0	1	0	0	0	1	0
N Cypress	8	22/04/2004	0	0	14	0	0	14	4	0	10
NE Matiset Narrows	12	22/04/2004	0	0	0	0	0	0	0	0	0
NW Bedwell	4	22/04/2004	1	250	0	1	30	0	0	1	30
S Cypress	9	22/04/2004	0	0	73	0	0	30	0	0	30
S Kraan	13	22/04/2004	0	0	400	0	0	30	0	0	30
S Matiset Narrows	7	22/04/2004	0	0	80	0	0	30	0	0	30

Site Name	Site #	Date (dd/mm/yy)	Total Capture			Reported Samples			Actual Samples		
			chinook	coho	chum	chinook	coho	chum	chinook	coho	chum
SW Bedwell	5	22/04/2004	0	0	740	0	0	30	0	0	30
W Bedwell	2	22/04/2004	0	0	300	0	0	30	0	0	31
Baxter	11	25/04/2004	0	0	800	0	0	29	0	0	29
Fortune Channel	6	25/04/2004	8	0	40	8	0	30	7	0	31
Fortune Channel	7	25/04/2004	0	0	3000	0	0	30	0	0	30
Fortune Channel	8	25/04/2004	0	0	0	0	0	0	2	0	28
Fortune Channel	9	25/04/2004	0	0	0	0	0	0	0	0	30
Fortune Channel	10	25/04/2004	5	0	24	5	0	24	4	0	26
Indian Bay	5	25/04/2004	0	0	7	0	0	7	0	0	7
Tofino Inlet	1	25/04/2004	33	1	20	30	1	20	29	1	19
Tofino Inlet	2	25/04/2004	30	0	130	30	0	30	27	0	31
Tofino Inlet	3	25/04/2004	30	0	40	30	0	30	30	0	30
Tofino Inlet	4	25/04/2004	14	0	60	14	0	30	15	0	30
Fortune Channel	8	28/04/2004	0	0	0	0	0	0	1	0	29
Bare Bluff	1	29/04/2004	2	0	210	2	0	30	2	0	31
E Bedwell	3	29/04/2004	0	0	40	0	0	20	0	0	20
Meares Island	14	29/04/2004	0	0	64	0	0	30	0	0	30
N Cypress	8	29/04/2004	0	0	2	0	0	2	0	0	2
NE Matlset Narrows	12	29/04/2004	0	0	72	0	0	29	0	0	29
NW Bedwell	4	29/04/2004	0	0	15	0	0	15	0	0	15
S Cypress	9	29/04/2004	0	0	0	0	0	0	0	0	0
S Matlset Narrows	7	29/04/2004	0	0	8	0	0	8	0	0	8
Sandy Beach	13	29/04/2004	0	0	80	0	0	30	0	0	31
SW Bedwell	5	29/04/2004	0	0	11	0	0	11	0	0	11
W Bedwell	2	29/04/2004	0	0	2	0	0	2	0	0	2
Baxter	11	02/05/2004	0	0	200	0	0	30	0	0	30
Fortune Channel	6	02/05/2004	0	0	500	0	0	30	0	0	30
Fortune Channel	7	02/05/2004	0	0	8	0	0	8	3	0	5
Fortune Channel	8	02/05/2004	3	0	75	3	0	30	3	0	30
Fortune Channel	9	02/05/2004	0	0	11	0	0	11	0	0	11
Fortune Channel	10	02/05/2004	0	0	0	0	0	0	0	0	0



Site Name	Site #	Date (dd/mm/yy)	Total Capture			Reported Samples			Actual Samples		
			chinook	coho	chum	chinook	coho	chum	chinook	coho	chum
Indian Bay	5	02/05/2004	0	0	8	0	0	8	0	0	10
Tofino Inlet	1	02/05/2004	3	0	100	3	0	30	3	0	30
Tofino Inlet	2	02/05/2004	4	0	23	4	0	23	4	0	23
Tofino Inlet	3	02/05/2004	16	0	40	16	0	30	14	0	31
Tofino Inlet	4	02/05/2004	0	0	1	0	0	1	0	0	1
Bare Bluff	1	05/05/2004	1	30	0	0	30	0	0	0	30
E Bedwell	3	05/05/2004	0	0	0	0	0	0	0	0	0
Meares Island	14	05/05/2004	0	0	70	0	0	30	0	0	30
N Cypress	8	05/05/2004	0	0	0	0	0	0	0	9	0
NE Matlset Narrows	12	05/05/2004	0	0	0	0	0	0	0	0	0
NW Bedwell	4	05/05/2004	1	0	0	1	0	0	0	0	1
S Cypress	9	05/05/2004	0	0	0	0	0	0	0	0	0
S Kraan	10	05/05/2004	0	0	0	0	0	0	0	0	0
S Matlset Narrows	7	05/05/2004	0	0	5500	0	0	30	0	0	30
SW Bedwell	5	05/05/2004	0	0	0	0	0	0	1	0	26
W Bedwell	2	05/05/2004	0	0	30	0	0	30	0	0	30
Baxter	11	09/05/2004	0	0	0	0	0	0	0	0	0
Fortune Channel	6	09/05/2004	0	0	0	0	0	0	0	0	30
Fortune Channel	7	09/05/2004	0	0	0	0	0	0	0	0	0
Fortune Channel	8	09/05/2004	0	0	60	0	0	30	1	1	28
Fortune Channel	9	09/05/2004	0	0	0	0	0	0	0	0	0
Fortune Channel	10	09/05/2004	0	0	1	0	0	0	0	0	0
Indian Bay	5	09/05/2004	0	0	0	0	0	0	0	0	0
Tofino Inlet	1	09/05/2004	1	0	1	1	0	1	1	1	0
Tofino Inlet	2	09/05/2004	4	0	30	4	0	30	3	0	29
Tofino Inlet	3	09/05/2004	30	0	3	30	0	3	27	0	5
Tofino Inlet	4	09/05/2004	5	0	0	5	0	0	5	0	0
Bare Bluff	1	15/05/2004	0	0	0	0	0	0	0	0	0
Meares Island	14	15/05/2004	0	0	200	0	0	30	0	0	30
N Cypress	8	15/05/2004	0	3	0	0	3	0	0	3	0
NE Matlset Narrows	12	15/05/2004	0	0	3000	0	0	30	0	0	30

Site Name	Site #	Date (dd/mm/yy)	Total Capture			Reported Samples			Actual Samples		
			chinook	coho	chum	chinook	coho	chum	chinook	coho	chum
NW Bedwell	4	15/05/2004	0	1	60	0	1	30	0	1	31
S Cypress	9	15/05/2004	0	0	0	0	0	0	0	0	0
S Matset Narrows	7	15/05/2004	0	0	21	0	0	14	0	0	14
Sandy Beach	13	15/05/2004	0	0	84	0	0	30	0	0	30
SW Bedwell	5	15/05/2004	16	0	0	16	0	0	0	0	16
W Bedwell	2	15/05/2004	0	0	0	0	0	0	0	0	0
Baxter	11	26/05/2004	0	0	1	0	0	1	1	0	0
Fortune Channel	6	26/05/2004	0	0	0	0	0	0	0	0	0
Fortune Channel	7	26/05/2004	0	0	4	0	0	4	4	0	0
Fortune Channel	8	26/05/2004	0	0	14	0	0	14	4	0	10
Fortune Channel	9	26/05/2004	0	0	0	0	0	0	1	0	0
Fortune Channel	10	26/05/2004	0	0	0	0	0	0	0	0	0
Indian Bay	5	26/05/2004	0	0	10	0	0	10	8	2	0
Tofino Inlet	1	26/05/2004	0	0	3	0	0	3	2	0	1
Tofino Inlet	2	26/05/2004	0	0	0	0	0	0	0	0	0
Tofino Inlet	3	26/05/2004	0	0	0	0	0	0	0	0	0
Tofino Inlet	4	26/05/2004	0	0	2	0	0	2	2	0	0
Baxter	11	01/06/2004	0	0	0	0	0	0	0	0	0
Fortune Channel	6	01/06/2004	0	0	0	0	0	0	0	0	0
Fortune Channel	7	01/06/2004	0	0	0	0	0	0	0	0	0
Fortune Channel	8	01/06/2004	0	0	1	0	0	1	1	0	0
Fortune Channel	9	01/06/2004	0	0	1	0	0	1	1	0	0
Fortune Channel	10	01/06/2004	0	0	0	0	0	0	0	0	0
Indian Bay	5	01/06/2004	0	0	2	0	0	2	1	1	0
Tofino Inlet	1	01/06/2004	1	0	5	1	0	5	4	1	0
Tofino Inlet	2	01/06/2004	0	0	0	0	0	0	0	0	0
Tofino Inlet	3	01/06/2004	0	0	0	0	0	0	0	0	0
Tofino Inlet	4	01/06/2004	0	0	0	0	0	0	0	0	0
Baxter	11	08/06/2004	0	2	0	0	2	0	0	1	1
Fortune Channel	6	08/06/2004	0	0	0	0	0	0	0	0	0
Fortune Channel	7	08/06/2004	0	0	0	0	0	0	0	0	0

Site Name	Site #	Date (dd/mm/yy)	Total Capture			Reported Samples			Actual Samples		
			chinook	coho	chum	chinook	coho	chum	chinook	coho	chum
Fortune Channel	8	08/06/2004	0	7	0	0	7	0	2	5	0
Fortune Channel	9	08/06/2004	0	0	0	0	0	0	0	0	0
Fortune Channel	10	08/06/2004	0	3	1	0	3	1	3	0	1
Indian Bay	5	08/06/2004	0	1	4	0	0	3	2	0	1
Tofino Inlet	1	08/06/2004	0	0	2	0	0	2	2	0	0
Tofino Inlet	2	08/06/2004	0	0	4	0	0	4	4	0	0
Tofino Inlet	3	08/06/2004	0	0	2	0	0	0	0	0	0
Tofino Inlet	4	08/06/2004	0	0	6	0	0	6	6	0	0
Unknown	NA	NA	0	0	0	0	0	0	1	3	30
<b>Totals</b>			<b>216</b>	<b>765</b>	<b>25261</b>	<b>211</b>	<b>154</b>	<b>1874</b>	<b>316</b>	<b>32</b>	<b>2086</b>

## **Appendix II – Individual Fish Data**

See attached digital file: Individual Fish Data Tofino 2004.xls

### Appendix III – Quality Control Comparison

This comparison contains only the data for fish with lice (n = 10 of 181 quality control specimens).

Site Name	Site Number	Date	Common Name	Tom McDonald			Mainstream Biological		
				Weight (g)	Length (mm)	Lice	Lice	Length (mm)	Weight (g)
Fortune Channel	7	04/25/04	chum	0.4	36	1	1	39	0.6
Fortune Channel	7	04/25/04	chum	0.6	38	1	1	42	0.7
Fortune Channel	7	04/25/04	chum	0.7	42	0	1	43	0.8
Fortune Channel	7	04/25/04	chum	0.7	43	0	1	44	0.8
Fortune Channel	7	04/25/04	chum	0.8	45	0	1	45	0.7
Fortune Channel	7	04/25/04	chum	0.8	45	0	1	47	0.8
Fortune Channel	7	04/25/04	chum	1.5	52	1	0	54	1.5
Fortune Channel	10	04/25/04	chum	0.7	39	1	1	42	0.6
Fortune Channel	10	04/25/04	chum	1.0	45	1	1	46	0.9
Tofino Inlet	3	04/25/04	chinook	0.9	47	0	1	48	1.1